

CLAIMS:

1. A method of measuring, in a lithographic manufacturing process using a lithographic projection apparatus, the overlay between a resist layer, in which a mask pattern is to be imaged, and a substrate, in which method use is made of at least one substrate overlay mark having a periodic structure with a period p_1 and a corresponding resist overlay mark

5 having a periodic structure with a period p_2 , characterized in that use is made of an alignment-measuring device, forming part of the apparatus and intended for measuring the alignment of a substrate alignment mark having a periodic structure with a period p_s which is substantially larger than the periods p_1 and p_2 , with respect to a reference mark having a periodic structure with a period p_r , adapted to the
10 period p_s , and in that an interference pattern, which is generated upon illumination of the substrate overlay mark and the resist overlay mark and has a period p_b , adapted to the period p_r , is imaged on said reference mark by means of alignment beam radiation.

2. A method as claimed in claim 1 characterized in that use is made of a substrate
15 reference mark having substantially the same period as the interference pattern, the substrate reference mark is imaged on the reference mark, and the difference between the positions of the image of the interference pattern and that of the substrate reference mark with respect to the reference mark is determined.

20 3. A method as claimed in claim 1 or 2, characterized in that use is made of gratings for the substrate overlay mark, and the resist overlay mark and the reference mark.

4. A method as claimed in claim 1, 2, or 3, characterized in that the resist overlay mark is a latent mark.

25 5. A method as claimed in claim 1, 2, 3 or 4, characterized in that an on-axis alignment measuring device is used and in that the reference mark is a mask alignment mark.

-6. A method as claimed in claim 5, characterized in that the interference pattern is imaged on a mask alignment mark via an optical filter, which selects diffraction orders of the radiation from the overlay marks to proceed to said mask alignment mark.

5 7. A method as claimed in claim 1, 2, 3 or 4, characterized in that an off-axis alignment device is used.

8. A method of manufacturing devices in at least one layer of substrates, which method comprises at least one set of the following successive steps:

- 10 - aligning a mask provided with at least one overlay mark with respect to a first substrate;
- imaging, by means of projection radiation, the overlay mark in a resist layer on the substrate;
- determining the overlay between the overlay mark formed in the resist layer
- 15 and an overlay mark in the substrate and correcting overlay errors;
- imaging, by means of projection radiation, a mask pattern comprising pattern features corresponding to device features to be configured in said layer in a resist layer on each substrate wherein the device features are to be formed, and
- removing material from, or adding material to, areas of said layer, which areas
- 20 are delineated by the mask pattern image, characterized in that the overlay is determined by means of the method as claimed in any one claims 1 to 7.